



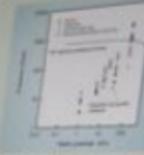




Soil-root interactions

When soil dries it becomes too strong for roots to elongate and...

The normal above-ground biomass response is a canopy 'greenhouse' effect as a greater volume of the pressure roots need to expand to create a cavity in soil, pushing on the walls and an equivalent growth constraint. At water potentials as high as -100 kPa the soil is too strong for roots to elongate. These data were obtained from laboratory experiments.



Effect of irrigation on dry matter and grain yield of wheat in the field. The data show field experiments over 2002 and a second in 2004. Each experiment was fully factorial (soil, each containing 4 compaction treatments: 0, 1, 2 and 3 passes of a heavy tractor over beds and the 100kPa). There were no significant ($P < 0.05$) main effects of compaction on dry matter or grain yield. There were significant interactions. The effect of irrigation on dry matter and grain yield is shown below.

	Dry matter yield (kg m ⁻²)		Grain yield (kg m ⁻²)	
	2002	2004	2002	2004
Water stress	1.00	1.75	0.00	0.00
Water stress x Soil	0.00	0.00	0.00	0.00
Water stress x Irrigation	0.00	0.00	0.00	0.00
Water stress x Compaction	0.00	0.00	0.00	0.00
Water stress x Irrigation x Soil	0.00	0.00	0.00	0.00
Water stress x Irrigation x Compaction	0.00	0.00	0.00	0.00
Water stress x Irrigation x Soil x Compaction	0.00	0.00	0.00	0.00
Water stress x Irrigation x Soil x Compaction x Irrigation	0.00	0.00	0.00	0.00

The soil and compaction both affect on water stress and physical resistance. See the effect of compaction on root growth and yield below.



The irrigation...
The compaction...
The soil...
The water stress...

References:
1. ...
2. ...
3. ...
4. ...
5. ...
6. ...
7. ...
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9. ...
10. ...

TOP 10 STATE VARIABLES FOR NBIO

- * e^- donors/acceptors | 3
- * biomass + turnover 3 (4+2) (variable 0-4)
- * specific rate reaction, of biplot * FUNCTIONAL REDUNDANCY
- * Key metabolic reactions | large met = 3
small met = 1
- * physical environment (T, porosity, part dist) ^{not org. dist.} geochem mineral.
-chemistry
- * community architecture (comp/distrib) 3' ^{each met.}
- * INHIBITORS !
- * LOCALIZATION OF ACTIVITIES CROSS-SCALE (M.m ↓ ; cm-m ↑)
landscape planet







